

ATOMIC ENERGY *newsletter*®

A SERVICE FOR INDUSTRY BUSINESS ENGINEERING AND RESEARCH
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Dear Sir:

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Disclosure that a Colorado uranium mining property bought for \$9 million by Atlas Corp., investment trust, has uranium ore reserves valued at \$4,083,750 (out of which mining and development costs must come) has been made by Atlas in a prospectus recently filed with the Securities & Exchange Commission. The property (Delta mine) which Atlas acquired from Vernon J. Pick, has 135,000 tons of ore assaying 0.35% uranium oxide. When Atlas bought the mine, it was said to have 300,000 tons of such ore, and subsequently Atlas stated that there were 600,000 tons available. Since July 1955, ore operations have been on a 5,000-6,000 ton per month scale, but it is expected that this will be reduced to a 2,500 ton rate shortly. Floyd B. Odium, president of Atlas, who negotiated the purchase, has invested approximately one-third of Atlas assets in uranium mining operations. (Other FINANCIAL NEWS, p. 5 this LETTER.)

Now in operation is the nuclear fuel element fabrication unit of Babcock & Wilcox's new Lynchburg, Va., plant. The first major one of its kind built in the U. S. with private financing, it will have an experimental area, in addition to the fabrication unit, to study reactor core components. Although the fabrication division is now working on flat-plate nuclear fuel elements, it is expected that rod and cylindrical fuel elements will be made in the future. (Other BUSINESS NEWS, p. 2 this LETTER.)

Negotiations are now underway between Gunnar Mines (Canada) and the Canadian government uranium purchasing unit toward Gunnar's obtaining a second sales contract for its uranium concentrates, Gilbert A. Labine, Gunnar president, told stockholders at the recent annual meeting. Gunnar now has a contract calling for delivery of \$79,500,000 of uranium precipitates by Oct., 1960, to Eldorado Mining & Refining Co., the government buying agency. Since this contract, ore reserves of \$130,000,000 have been outlined, and it is believed that Gunnar desires the additional reserves to be covered by purchase contracts. (Other RAW MATERIAL NEWS, p. 5 this LETTER.)

The economic impact of atomic energy and its problems and opportunities will be covered in a conference designed for business executives, to be sponsored June 9-13, 1956, by the School of Industrial Management at Massachusetts Institute of Technology. Chairman of the conference will be W. A. W. Krebs, Jr., M.I.T. Conference leaders will include Manson Benedict, professor of nuclear engineering, M.I.T.; W. E. Barbour, Jr., of Tracerlab, Inc., Boston; Harvey Brooks, professor of applied physics, Harvard University; and others.

Revealed for the first time recently to United States and British visiting physicists was a Soviet synchrocyclotron said to have 10 billion electron-volt energy. The machine was at a Soviet research center some 62 miles north of Moscow, the existence of which was previously unknown. Louis Alvarez, of the University of Calif., one of the 12 visitors from the U.S., said that in design and principle the Soviet machine was the same as the one at the Berkeley campus of the University. He noted, however, that in construction "it is such absolutely first-class work".

ATOMIC ENERGY BUSINESS NEWS...

ADDITIONAL PROPOSALS MADE FOR URANIUM PROCESSING PLANTS:- Two more groups of industrial firms have now revealed their intentions of submitting proposals to the USAEC for privately operated uranium processing plants. In one bid, Vitro Corp. will join with Goodrich Chemical to build a plant. Another will be a joint operation of Union Carbide Nuclear Co., and Catalytic Construction Co. (As previously announced, Climax Molybdenum and Mallinckrodt Chemical are also teaming up to construct and operate such a plant.) The plants are to produce uranium hexafluoride and tetrafluoride from uranium ores, and also uranium oxide. Present proposals are the result of solicitations made to industrial groups by the USAEC in November, 1955, when more than 60 companies showed interest; since then, the number of those interested has narrowed to perhaps a dozen firms, at most.

NUCLEAR DEPARTMENT ESTABLISHED BY ION EXCHANGE FIRM:- A nuclear department has been set up by Ionics, Inc., Cambridge, Mass., because of the firm's desire to expand its atomic development work, according to Walter A. Juda, executive vice-president. The firm, which works in ion exchange and electric membrane development, has developed analytical techniques and purification systems for reactor coolant water for the power plant of the submarine Nautilus and other reactors, under a subcontract to Westinghouse Electric Corp. Ionics is also designing equipment for fission product disposal systems under development at Brookhaven National Laboratory, and has studied fission product separation for the U. S. Air Force, and isotope separations for the USAEC.

CONSTRUCTION PERMIT ISSUED FOR NEW CALIFORNIA REACTOR:- A permit has been issued General Electric Co. by the USAEC to build a developmental boiling water reactor at GE's new atomic laboratory in Alameda County, Calif. The reactor will be used to obtain technical data for the full-scale boiling water power reactor that GE is going to build in Grundy County, Ill., for Commonwealth Edison Co., of Chicago. Initially, the developmental unit will generate 3000 KW; it will operate on an enriched uranium fuel. However, GE plans to increase the output and ultimately sell the power produced to Pacific Gas & Electric for distribution over its system. The reactor is scheduled for completion before the end of February, 1958.

LOAN GRANTED FOR ELECTRIC COOPERATIVE'S NUCLEAR POWER PLANT:- The Rural Cooperative Power Assoc., Elk River, Minn., has been granted a loan of \$6,702,000 by the Rural Electrification Administration (REA) to help it finance a 22,000 KW nuclear power station which the Elk River cooperative will build under the USAEC's small-scale reactor program. The financial assistance which the USAEC grants under this program had been contingent upon these additional monies being made available by the REA.

PROBLEMS OF NUCLEAR FINANCING RECOUNTED:- Private capital is needed by firms in the nuclear field, the National Federation of Financial Analysts Societies was told at its annual meeting last fortnight in Boston. William O. Faxon, president of Tracerlab, Inc., Boston, manufacturer and processor of nucleonic materials, told the analysts that the question of the moment is whether financial groups will provide the funds at as fast a pace as its scientific developments warrant and management planning desires. Immediate returns to the financier (in the atomic industry) may be slow, Mr. Faxon warned, but he said there is no question that future returns are real and substantial. He observed that the atomic industry is now spending \$50 million annually on research and development.

BIDS ASKED, CONTRACTS AWARDED...for nuclear facilities...

BIDS ASKED:- Bids are now being asked under inv. no. 401-56-9A for construction of biology and mouse genetics facilities at Oak Ridge, Tenn. Details from: USAEC, P.O. Box E, Oak Ridge, Tenn. Bid closing date is June 26, 1956.

CONTRACTS AWARDED:- New uranium exploration contracts have been executed by the Defense Minerals Exploration Administration (DMEA) with these firms: Colamer Corp., \$76,935; Parador Mining Co., Inc., \$34,185; Jack S. Josey and F. C. Roper, \$29,689; and Food Machinery & Chemical Corp. (three contracts), \$154,182. The ventures are in Colorado and New Mexico.

On a low bid of \$8,828,900, John McShain, Inc., Phila., Pa. has obtained a contract to build the USAEC's new headquarters building near Germantown, Md. McShain won out over 12 other bidders. Cost of the entire project is estimated at \$10 million; architects are Voorhees, Walker, Smith & Smith, New York.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear lab & plant...

NEW PRODUCTS OFFERED:- A new light weight scintillometer is said to offer sensitivity sufficient to allow it to be used for aircraft prospecting for radioactive minerals. Complete weight of the instrument is 12-lbs. Sensing element is a 7"x2-3/4" plastic phosphor. --Nuclear Enterprises, Ltd., Winnipeg 9, Manitoba, Canada.

Specially made chemical rubber gloves are offered by this manufacturer for protection against contamination with radioactive materials.-- Charleston Rubber Co., Charleston, S. C.

NEW DEVICES IN ENGINEERING STAGE:- Now on the drawing boards at Shawinigan Engineering Co., Ltd., Montreal, Canada, is the Canada-India nuclear reactor (CIR) which is being supplied to the Government of India by Canada under the Colombo Plan (a means of assisting underdeveloped regions). The reactor, a modified version of the NRX research reactor at the Chalk River project of Atomic Energy of Canada, Ltd., will be installed at the Indian research project at Trombay, India, about seven miles from Bombay. Shawinigan Engineering is designing the CIR research reactor, and will supervise its manufacture and installation. It will have a neutron flux and power similar to the NRX reactor; the power of the latter is 40,000 KW of heat energy.

NEW PROCESSES:- A liquid extraction process, by which uranium and vanadium are removed from sulfuric acid leach liquors by selective organic extractants, was recently described by R.A. Foos, of Electro Metallurgical division of Union Carbide & Carbon, before the Commercial Chemical Development Assoc. meeting at Pocono Manor, Pa. Foos noted that if the chemical industry can find organics that are cheap, selective, and readily available, they may find immediate use in uranium processing. Five domestic uranium producers are now testing the idea, he stated, and while the economics of the procedures are not complete, Foos said that many workers believe liquid extraction processes will eventually replace the ion exchange methods now used.

Initial step has now been taken to provide broader participation of government civilian agencies in the U.S. Army's program to preserve food by irradiation methods, with the setting up of an Interdepartmental Committee under W H. Martin, Army research and development director. Committee is composed of Departments of State, Agriculture, Commerce, Health, Education & Welfare, and the USAEC.

Pointing out that the amount spent on research by the coal industry in the U.S. is small compared with research expenditures in other industries (\$17 million in 1955), the nuclear gasification of coal is recommended as a major area of research, in a joint government-industry report recently released by the U.S. Bureau of Mines, Pittsburgh, Pa. The report: "Outlook and Research Possibilities for Bituminous Coal", may be obtained from the Bureau in Pittsburgh.

MANUFACTURERS' LITERATURE:- A new line of radioactivity detecting scintillation counters is described in Nuclear Instrument & Chemical Corp. (Chicago, Ill.) May, 1956, issue of the "Nucleus", available upon request.

Recently issued catalog of Tracerlab, Inc., Boston, Mass., shows that firm's technical services, isotopically labeled compounds, radioactive sources, etc., all in the nuclear field. Useful tables are also included. The catalog is free on request.

ATOMIC PATENT DIGEST...latest industrial grants...

Process for separating zirconium and hafnium halides from vaporous mixtures. U. S. Pat. No. 2,744,060 issued May 1, 1956; assigned to E. I. du Pont de Nemours & Co., Wilmington, Del. (Inventor: Russell B. Eaton.)

Apparatus for analyzing by X-ray radiation. U. S. Pat. No. 2,745,019 issued May 8, 1956; assigned to North American Phillips Co., Inc., New York, N.Y. (Inventor: Edward A. Hamacher.)

Phosphor elements for use in the detection and measurement of ionizing radiation. U. S. Pats. Nos. 2,745,967 & 8, issued May 15, 1956; assigned to Texaco Development Corp., New York, N.Y. (Inventor: Clifford G. Ludeman.)

Nuclear radiation shield (transparent) utilizing glasses containing oxides of beryllium, lithium and boron. U. S. Pat. No. 2,747,105 issued May 22, 1956; assigned to Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Inventors: J. V. Fitzgerald, G. S. Bachman.)

Detection devices using photosensitive material for detecting and indicating the presence of nuclear radiation. U. S. Pat. No. 2,747,103 issued May 22, 1956; assigned to Polaroid Corp., Cambridge, Mass. (Inventors: M. N. Fairbank, W. A. Shurcliff.)

RADIATION HAZARDS IN THE ATOMIC ENERGY PROGRAM: A special condensation of remarks by C. G. Manly, (division of civilian application, USAEC) before eastern N.Y. chapter, Am. Soc. of Safety Eng., Latham, N.Y., May 14, 1958.

In the atomic energy program in the U. S., over an eleven year period, two people died of radiation injuries, none were caused by nuclear reactor operation, and 184 persons died of other injuries caused by "normal" industrial-type accidents.

A radiation safety record such as this, which was achieved by the USAEC and its contractors, cannot be sustained without considerable cost. The increased cost is encountered in all operations, from the processing of raw materials, to the handling of finished products and wastes.

These costs sometimes pyramid. In a laboratory, shields of lead brick, expensive in themselves, require that workbenches which support them be many times stronger than an ordinary bench. It follows, then, that the floor and substructure of the building must be designed to carry very heavy loads. A single shielded enclosure necessary for working in safety may cost as much as \$80,000, compared to \$2,000 in an ordinary laboratory. Work done in such "hot caves" may consume five times as many man-hours as ordinary laboratory work.

For one kind of plant that handles large amounts of radioactive material, estimates of original construction cost ran about 12 times what they would have been for a similar plant handling non radioactive material. Nearly two-thirds of the operating expense for such a plant, including depreciation, would be incurred solely because radiation was present. Of course, this was an extreme case. However, even in such comparatively simple tasks as laundering contaminated work clothes, the costs may be half again as much as for ordinary clothes.

While experience and new knowledge may reduce the cost of radiation protection in the years ahead, savings will be limited by the standards of radiation exposure that must be enforced.

I would now like to review some of the health and safety aspects of a nuclear power plant.

While the nuclear power plant will have many of the same problems of the conventional power plant, from the point of view of safety, it will differ in two important respects: (1) in the nuclear power plant large quantities of radioactive material will constantly be created and held in storage, and (2) within the reactor vessel of the nuclear power plant there will be enough fuel for months, or years, of normal operation.

To control the radiation in such a plant, precautions must be taken. Solid fuel elements are normally canned in corrosion-resistant materials to keep the fission products in them from escaping into the cooling fluid. The coolant plumbing, in turn, must be exceptionally leak-tight. Secondary containment must be provided to prevent escape of radioactivity in the event the plumbing does leak. Care must also be taken that chemically active radioactive materials cannot come together and produce fires or explosions as a result of ordinary leaks or parts failures.

Disposal of contaminated waste materials must be carefully planned and controlled. Such waste might include demineralizer resins and regenerating solutions; surge tank vapors; and ventilation air contaminated by minor accidents. Gaseous and airborne wastes must be controlled by filtration and dilution with air; mildly radioactive liquids by holding them for a time while they decay into nonradioactive forms, and by filtration and dilution with uncontaminated water. More dangerous liquids must be concentrated and put into safe storage; some miscellaneous contaminated materials must be buried; and other materials must be burned in specially designed incinerators.

Another general problem of the nuclear plant, not found in the conventional generating plant, is the control of the rate of energy release. While a certain minimum amount of nuclear fuel is required to maintain the chain reaction, in a power reactor the excess fuel which is present (to eliminate need to refuel constantly) may represent millions of kilowatts of energy. In the event of a large scale disaster (due to an uncontrolled release of this energy) it would be hoped that even in the worst case only a small fraction of the contained radioactivity would be released into the reactor building, and that this could be contained there. The harmful effects of a leak, if the building were not gas tight, can be reduced by locating plant in an uninhabited area.

ATOMIC ENERGY FINANCIAL NEWS...

CORPORATE OFFERINGS MADE IN NUCLEAR FIELD:- Shares in the firm of International Atomic Devices Corp., Trenton, N. J., are to be offered by the underwriter Louis R. Dreyling & Co., 181 Gatzmer Ave., Jamesburg, N.J. at \$5 retail. Dreyling will offer 59,500 shares of \$2 par common stock in an "A" filing. The gross spread will be \$1, with 50% concession to the retailing dealer. The firm will use the proceeds for general corporate purposes.

The stock offering of the Atomic, Electronic & Chemical Fund, Inc., Englewood, N. J., to be made by the underwriter Lee Higginson Corp., New York, is expected in late June. Some 400,000 shares of \$1 par capital stock will be offered; the firm will use the proceeds for investment. (New name of this Fund is Nucleonics, Chemistry & Electronics Shares, Inc.)

Western Gold & Uranium (traded over the counter) has sold privately \$120,000 of 4% five-year notes callable at par on or after April 2, 1958, according to Ralph G. Brown, president. Mr. Brown said this provides ample capital to bring the firm's Orphan uranium property (of its Golden Crown subsidiary) into production.

STOCKS OF NUCLEAR & URANIUM MINING FIRMS FOLLOW DECLINING MARKET TREND:- Stocks of firms in the nuclear field, and uranium mining shares, followed the general downward trend that for the past fortnight has characterized the exchanges and unlisted offerings in the United States, Canada and Great Britain. Especially depressed were uranium mining stocks on the Toronto exchange. Easson's uranium index stood at 216.3 last fortnight, as compared with the 1956 high of 268.7 and the low of 205.4.

GOOD PROFITS EXPECTED FROM USAEC CONTRACT, FIRM STATES:- National Research Corp. "has a very favorable contract and we will show a substantial return on the investment on the price quoted" according to Richard S. Morse, president, in referring to the contract recently received from the USAEC by the firm's subsidiary NRC Metals Corp. to supply the USAEC with 700,000-lbs. of zirconium per year for five years at \$6.50 per lb. Mr. Morse observed that National Research operated in the "black" in the March quarter of this year in contrast to a loss suffered in a similar period last year.

NOTE:- This LETTER stated (May 15, 1956; Vol. 15 No. 7) that stockholders of Atomic Development Mutual Fund, Inc. were not advised whether the increase in asset value of the Fund was due to portfolio appreciation or to new share purchases by the public. Actually, the net asset value per share was \$14.06 on March 31, 1955 and \$15.18 per share on March 31, 1956 and stockholders were so advised. The Editor and Staff of this LETTER regret this incorrect statement, and appreciate the assistance of Newton I. Steers, Jr., president of the Fund, in calling this to our attention.

RAW MATERIALS...mining, marketing, prospecting...

UNITED STATES:- The USAEC will continue to buy domestic uranium ore after the present buying plan expires March 31, 1962, but will generally pay less and may not take all that's offered. Under the new program, a set price of \$8 per pound of uranium oxide will be paid, as needed. (Now, the USAEC must buy all that's offered, and while prices vary, they are generally higher than \$8 per pound.) The USAEC also noted that after Mar. 31, 1962, uranium oxide sales may be made to licensed commercial users, a practice now forbidden. The initial production bonus the USAEC pays for the first 10,000-lbs. of uranium oxide from a new source is also being extended from Feb. 28, 1957 to Mar. 31, 1960. This incentive bonus ranges from \$1.50 a pound to \$3.50 a pound depending on the uranium oxide content of the ore.

CANADA:- With the expiration of the Mar. 31, 1956 deadline beyond which no applications for premium price contracts could be made by Canadian mines with Eldorado Mining & Refining, Ltd., the Government buying agency, several mines have received written notification from Eldorado that their applications have been accepted. Greyhawk Uranium, Dyno Mines, Stancan Uranium, and others are understood to have received written notification.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

May 29, 1956

